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Shafiee, Sara; Piroozfar, Poorang ; Hvam, Lars

*Published in:*

Proceedings of the International Conference on Industrial Engineering and Operations Management

*Publication date:*

2018

*Document Version*

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Shafiee, S., Piroozfar, P., & Hvam, L. (2018). Product Modularization in the Architecture, Engineering and Construction (AEC) Industry. In *Proceedings of the International Conference on Industrial Engineering and Operations Management* (pp. 474-475). IEOM Society International.

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# **Product Modularization in the Architecture, Engineering and Construction (AEC) Industry**

**Sara Shafiee**

Department of Mechanical Engineering  
Technical University of Denmark  
2800 Kgs. Lyngby, Denmark  
[sashaf@dtu.dk](mailto:sashaf@dtu.dk)

**Poorang Piroozfar**

School of Environment and Technology  
University of Brighton  
Cockcroft Building, Brighton, East Sussex, BN2 4GJ, UK3  
[a.e.piroozfar@brighton.ac.uk](mailto:a.e.piroozfar@brighton.ac.uk)

**Lars Hvam**

Department of Management Engineering  
Technical University of Denmark  
2800 Kgs. Lyngby, Denmark  
[lahv@dtu.dk](mailto:lahv@dtu.dk)

## **Abstract**

All industries benefit from product standardization and modularization in order to automate the sales and production processes. The Architecture, Engineering and Construction (AEC) industry is lagging behind due to the challenges it is faces with compared to other industries. The literature discusses how to apply modularization in construction industries, however, what seems to still be missing are guidelines and case examples for both researchers and practitioners. In this study, we discuss two main modularization strategies and investigate how and where they were applied in different construction companies. This research benefits from comparative case studies research in order to make deductions from different empirical data to draw a logically plausible conclusion. The gathered empirical data and the results from industrial expert interviews can then be used as guidelines for the companies to analyze how and where to use different modularization techniques and what are the gained benefits and challenges.

## **Keywords (12 font)**

Case study research, Construction industry, Product Architecture, Product modularization, Product standardization,

## **Biographies**

**Sara Shafiee** is a postdoctoral research fellow at the Technical University of Denmark, Department of Mechanical Engineering. She has the experience of working in Engineer-To-Order companies as IT Project Manager and Senior Business Consultant and developing and maintaining more than 10 Product Configuration Systems. Her research is focused on Product Configuration systems challenges for complicated highly engineered products. She has a series of papers about product configuration projects scoping, documentation and modeling, knowledge management, IT tools integrations in international conferences and journals.

**Poorang Piroozfar** is an architect, a principal lecturer (associate professor) in architectural technology, the academic subject lead for the built environment and construction and the director of the Built Environment Research Group (BERG) at School of Environment and Technology, University of Brighton, UK. His research specialization

is in mass customization and personalization in the built environment, architecture and construction. His other research interests span over the application of advanced technologies in the AEC industry – including AI, Machine Learning, IoT, Gamification, BIM, BEM/BES, AR/VR, UAV, and Robotics in the AEC industry – Integrated Design, Expert Systems, the dialogical interaction between theory and practice, and design research.

**Lars Hvam** is Professor at the Technical University of Denmark. He has been working on product configuration for more than 15 years as a teacher, a researcher and as consultant for more than 15 configuration projects in large industrial companies. He has supervised eight Ph.D. projects on the construction and application of configuration systems and has been the project lead for four large research projects on product configuration. Lars Hvam is also the founder and current chairman of the Product Modelling Association ([www.productmodels.org](http://www.productmodels.org)), whose aim is to disseminate knowledge of the possibilities offered by product configuration.